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John F Kacvinsky
c/o BLAKELY SOKOLOFF TAYLOR & ZAFMAN LLP
12400 Wilshire Boulevard Seventh Floor
Los Angeles, CA 90025

EXAMINER

MEW, KEVIN D

ART UNIT	PAPER NUMBER
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2616

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/599,000	Applicant(s) DAVIS, ARLIN R.	
	Examiner Kevin Mew	Art Unit 2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10, 12-14 and 17-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 12-14 and 17-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Detailed Action

Response to Amendment

1. Applicant's Arguments/Remarks filed on 4/6/2006 regarding claims 1-10, 12-14 and 17-33 have been considered and claims 1-10, 12-14 and 17-33 are currently pending. Claims 11, 15, 16 have been canceled by applicant.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 6-7, 10, 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Forin (USP 6,321,276).

Regarding claim 6, Forin discloses a node apparatus (personal computer 20, see col. 6, lines 47-55 and Figs. 1 and 6) comprising:

a channel adapter (**a VIA Network Interface Adapter**, see element 100, Fig. 6) to interface a host to a switched fabric (**VIA Network Interface Adapter to interface with a remote router**, see col. 6, lines 47-55 and Fig. 1);

an emulation driver (**VI kernel agent**, see col. 15, lines 20-36 and Fig. 6) coupled to the channel adapter (**VI kernel agent coupled to VIA Network Interface Adapter**, see Fig. 6), the emulation driver mapping a first physical address of a remote node (**a virtual memory address**)

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to a second physical address (**a physical memory address**) of the remote node (**VI kernel agent translates virtual memory address to a physical memory address**, see col. 18, lines 3-7), the channel adapter (**VI Network Interface Adapter**) mapping the second physical address of the remote node to a channel to communicate with the remote node (**recoverable I/O request processor of the VIA Network Interface Adapter translates the physical memory address and sending the buffer data to a remote VIA Network Interface Adapter over a network**, see col. 17, lines 32-51), wherein the second physical address (**physical memory address**) is embedded within the first physical address (**virtual memory address; note that virtual memory address is mapped to physical memory address**, see col. 18, lines 3-7).

a first virtual interface (VI) work queue pair (**a first pair of send and receive queues in personal computer 20**, see col. 15, lines 37-43, elements 107, 108, Fig. 6) coupled to the host (**a personal computer**, element 20, Fig. 1) to establish a VI channel between the host and the remote node (**remote personal computer**, element 49, Fig. 1) of the local network (**establishing a VI connection between VIA network interface adapter 100 and a remote adapter over a network**, col. 17, lines 32-51 and elements 106, 107, 108, Fig. 6),

wherein the first work queue pair (**a first pair of send and receive queues in personal computer 20**, see col. 15, lines 37-43, elements 107, 108, Fig. 6) comprising descriptors to describe data to be transmitted (**comprising a descriptor to describe the virtual memory address of the buffer to be sent**, co. 15, lines 43-46) from a first node (**from a first personal computer**, element 20, Fig. 1) to a remote node (**to a remote personal computer**, element 49, Fig. 1) of a local network (**of the networked environment**, see Fig. 1) and to describe where to

store data received from the remote node (**and a descriptor to describe the virtual address of the buffer where data is received from a remote location**, see col. 15, lines 46-49),

wherein the remote node comprises a second work queue pair (**remote computer comprises a VI interface of a second pair of send and receive queues**; note that a remote personal computer 49 has similar components as personal computer 20, see col. 6, lines 47-55 and thus remote personal computer 49 has network interface adapters similar to 54 and 54a, Fig. 1 and virtual interfaces similar to 106, Fig. 1, see also col. 7, lines 4-9, and Fig. 6) and wherein the VI channel is established by associating the first work queue pair with the second work queue pair (**VI channel connection is established by having a descriptor posted in the receive queue of a host that includes a virtual address of the buffer where data received from a send queue of a remote location are to be stored** and thus the receive queue of a virtual interface of a local personal computer is associated with the send queue of a virtual interface of a remote personal computer, col. 15, lines 37-53; thus the first work queue pair is associated with the second work queue pair; see also paragraph 0022 of Regneir on how VI connection is established);

Regarding claim 7, Forin discloses the apparatus of claim 6 wherein first physical address comprises a legacy or global physical address (**virtual memory address**), and wherein the second physical address comprises a local physical address (**physical memory address**, see col. 18, lines 3-7).

Regarding claim 10, Forin discloses the apparatus of claim 7 wherein the local physical address (**physical memory address**) can be used by the node apparatus for communication with other nodes on the local network (see col. 18, lines 3-7).

Regarding claim 13, Forin discloses the apparatus of claim 6 wherein the channel adapter comprises a host channel adapter (**VIA network interface adapter 100**, see col. 17, lines 40-48 and Fig. 6).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-5, 8-9, 12, 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forin et al. (USP 6,321,276) in view of Regnier et al. (US Publication 2002/0062402).

Regarding claim 1, Forin discloses an apparatus at a node (**personal computer**, see element 20, Fig. 1) in a network (**in a networked environment**, see Fig. 1) comprising:

a first work queue pair (**a first pair of send and receive queues in personal computer 20**, see col. 15, lines 37-43, elements 107, 108, Fig. 6) comprising descriptors to describe data to be transmitted (**comprising a descriptor to describe the virtual memory address of the buffer to be sent**, co. 15, lines 43-46) from a first node (**from a first personal computer**, element 20, Fig. 1) to a remote node (**to a remote personal computer**, element 49, Fig. 1) of a local network

(of the networked environment, see Fig. 1) and to describe where to store data received from the remote node (and a descriptor to describe the virtual address of the buffer where data is received from a remote location, see col. 15, lines 46-49) to establish a connection-oriented virtual interface (VI) channel between the first node and the remote node in the local network (establishing a VI logical connection between the first personal computer and the remote personal computer, col. 6, lines 47-55, col. 17, lines 32-51),

wherein the remote node comprises a second work queue pair (remote computer comprises a VI interface of a second pair of send and receive queues; note that a remote personal computer 49 has similar components as personal computer 20, see col. 6, lines 47-55 and thus remote personal computer 49 has network interface adapters similar to 54 and 54a, Fig. 1 and virtual interfaces similar to 106, Fig. 1, see also col. 7, lines 4-9, and Fig. 6) and wherein the connection-oriented VI channel is established by associating the first work queue pair with the second work queue pair (VI channel connection is established by having a descriptor posted in the receive queue that includes a virtual address of the buffer where data received from a send queue of a remote location are to be stored and thus the receive queue of a virtual interface of a local personal computer is associated with the send queue of a virtual interface of a remote personal computer, col. 15, lines 37-53; thus the first work queue pair is associated with the second work queue pair; see also paragraph 0022 of Regneir on how VI connection is established);

a channel adapter (VIA Network Interface Adapter, see element 100, Fig. 6) coupled to the first work queue pair (VIA network Interface Adapter coupled to VI send and receive queues, see element 106, 107, 108, Fig. 6), the channel adapter (VIA Network Interface

Adapter of the personal computer, see col. 6, lines 47-55 and Figs. 1 and 6) to interface a host to a switched fabric (**VIA Network Interface Adapter to interface with a remote router**, see col. 6, lines 47-55 and Fig. 1); and

an emulation driver (**VI kernel agent**, see col. 15, lines 20-36 and Fig. 6) coupled to the channel adapter (**VI kernel agent coupled to VIA Network Interface Adapter**, see Fig. 6), the emulation driver mapping a legacy physical address (**a virtual memory address**) to the local physical address (**a physical memory address**) of the remote node of the local network (**VI kernel agent translates virtual memory address to a physical memory address**, see col. 18, lines 3-7), the channel adapter (**VI Network Interface Adapter**) mapping the local physical address of the remote node to the established connection-oriented VI channel to communicate with the remote node (**recoverable I/O request processor of the VIA Network Interface Adapter translates the physical memory address and sends the buffer data to a remote VIA Network Interface Adapter over a network**, see col. 17, lines 32-51).

Forin does not explicitly show the VI channel connection established between a host node and each of the remote nodes in a network based on local physical addresses of the remote node.

However, Regnier discloses establishing a VI connection from a process in a first computer to a second process in a second computer by determining the destination address of the second computer (**based on the physical address of the second computer**, paragraphs 0021, 0022, 0035, page 4, claim 12, lines 58-67 and page 5, lines 1-4).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the VIA network adapter of Forin with the teaching of Regnier

such that the VI channel connection established between a host node and each of the remote nodes in a network based on local physical addresses of the remote node. The motivation to do so is to use the physical address of the remote node to specify the physical location of the remote node to which data messages are transferred.

Regarding claim 2, Forin discloses the apparatus of claim 1 wherein the local physical address of the remote node (**physical memory address**) is embedded or provided within the legacy physical address (**virtual memory address**) of the remote node (**virtual memory address is mapped to physical memory address**, see col. 18, lines 3-7).

Regarding claim 3, Forin discloses all the aspects of the claimed invention set forth in the rejection of claim 3 above, except fails to explicitly show the apparatus of claim 1 wherein the legacy physical address comprises a MAC address for use in an existing or legacy network.

However, Forin discloses that the VIA network interface adapter can be an Ethernet card (see col. 14, lines 52-61).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system and method of processing I/O requests in Forin with the teaching of using an Ethernet card for the VIA Network Interface Adapter in Forin such that the virtual memory address comprises an Ethernet MAC address. The motivation to do so is to provide high-speed data communications between a host and a remote router on an Ethernet network using Ethernet MAC addressing scheme.

Regarding claim 4, Forin discloses all the aspects of the claimed invention set forth in the rejection of claim 3 above, except fails to explicitly show apparatus of claim 1 wherein the legacy physical address comprises a IEEE 802.3 Ethernet MAC address.

However, Forin discloses that the VIA network interface adapter can be an Ethernet card (see col. 14, lines 52-61).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system and method of processing I/O requests in Forin with the teaching of using an Ethernet card for the VIA Network Interface Adapter in Forin such that the virtual memory address comprises an IEEE 802.3 Ethernet MAC address. The motivation to do so is to provide high-speed data communications between a host and a remote router on an Ethernet network using the standard IEEE 802.3 Ethernet MAC addressing scheme.

Regarding claim 5, Forin discloses the apparatus of claim 1 and further comprising a protocol stack (elements 102, 111, 110, 100, Fig. 6) coupled to the emulation driver (**coupled to VI kernel agent**, see Fig. 6), the protocol stack implementing a legacy protocol (**the protocol stack implements an Ethernet protocol**, see col. 14, lines 52-61) and mapping a network address to a legacy physical address for each of a plurality of nodes (**VIA network interface adapter translates virtual memory addresses to physical memory addresses**, see col. 14, lines 61-67).

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Regarding claim 8, Forin discloses all the aspects of the claimed invention set forth in the rejection of claim 7 above, except fails to explicitly show the apparatus of claim 1 wherein the legacy physical address comprises a MAC address for use in an existing or legacy network.

However, Forin discloses that the VIA network interface adapter can be an Ethernet card (see col. 14, lines 52-61).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system and method of processing I/O requests in Forin with the teaching of using an Ethernet card for the VIA Network Interface Adapter in Forin such that the virtual memory address comprises an Ethernet MAC address. The motivation to do so is to provide high-speed data communications between a host and a remote router on an Ethernet network using Ethernet MAC addressing scheme.

Regarding claim 9, Forin discloses all the aspects of the claimed invention set forth in the rejection of claim 7 above, except fails to explicitly show apparatus of claim 1 wherein the legacy physical address comprises a IEEE 802.3 Ethernet MAC address.

However, Forin discloses that the VIA network interface adapter can be an Ethernet card (see col. 14, lines 52-61).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system and method of processing I/O requests in Forin with the teaching of using an Ethernet card for the VIA Network Interface Adapter in Forin such that the virtual memory address comprises an IEEE 802.3 Ethernet MAC address. The motivation to

do so is to provide high-speed data communications between a host and a remote router on an Ethernet network using the standard IEEE 802.3 Ethernet MAC addressing scheme.

Regarding claim 12, Forin discloses all the aspects of the claimed invention set forth in the rejection of claim 6 above, except fails to explicitly show the apparatus of claim 6 wherein the channel adapter comprises an ATM NIC for interfacing to an ATM network.

However, Regnier discloses a method for providing data movement between endpoints connected by multiple VI channels (see paragraph 0023) and that ATM network can be used as the data network between endpoints (see paragraph 0012).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system and method of processing I/O requests in Forin with the teaching of connecting a source node and a remote node via an ATM network such that the VIA network interface adapter would be a ATM NIC. The motivation to do is to interface the VI Network Interface Adapter with other networks such as ATM if an ATM network is being used.

Regarding claims 31, 33, Forin discloses a method of communicating a message over a channel based network comprising:

obtaining a local physical address for a first node of a network (**virtual memory address of a personal computer**, see col. 18, lines 3-7);

obtaining a legacy or global physical address for the first node based on the local physical address of the first node (**physical memory address is obtained from virtual memory address**, see col. 18, lines 3-7);

the work queue pair (**a first pair of send and receive queues in personal computer 20**, see col. 15, lines 37-43, elements 107, 108, Fig. 6) comprises descriptors to describe data to be transmitted (**comprising a descriptor to describe the virtual memory address of the buffer to be sent**, co. 15, lines 43-46) and to describe when to store received data (**and a descriptor to describe the virtual address of the buffer where data is received from a remote location**, see col. 15, lines 46-49);

generating a message to be sent to the second node (**sending data to a remote node**, col. 9, lines 39-56), the second node including a global or legacy physical address (**the second personal computer is similar to the first personal computer and is comprised of physical memory address**, col. 6, lines 47-55);

mapping the global physical address of the second node (**physical memory address**) to a local physical address of the second node (**is mapped to virtual memory address**, col. 9, lines 18-38);

mapping the local physical address of the second node to the VI channel established between the first and second nodes (**virtual memory address of the descriptor is mapped to the VI send queue**, col. 15, lines 37-49);

sending the message to the second node over the established VI channel (**sending data to the remote node over the VI send queue**, col. 15, lines 37-53).

Forin does not explicitly show obtaining a local physical address for one or more other nodes in the network and establishing a connection-oriented virtual interface (VI) channel between the first node and each of the one or more other nodes in the network based on local physical addresses of the other nodes using a work queue pair.

However, Regnier discloses establishing a VI connection from a process in a first computer to a second process in a second computer by determining the destination address of the second computer (**based on the physical address of the second computer**, paragraphs 0021, 0022, 0035, page 4, claim 12, lines 58-67 and page 5, lines 1-4).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the VIA network adapter of Forin with the teaching of Regnier such that the VI channel connection established between a host node and each of the remote nodes in a network based on local physical addresses of the remote node using the send and receive queue of the VI channel. The motivation to do so is to use the physical address of the remote node to specify the physical location of the remote node to which data messages are transferred.

Regarding claim 32, Forin discloses the method of claim 31 wherein the local physical address is embedded in the global physical address of the second node (**virtual memory address; note that virtual memory address is mapped to physical memory address**, see col. 18, lines 3-7).

4. Claims 14, 17-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forin et al. (USP 6,321,276) in view of Regnier, and in further view of Nguyen et al. (US Publication 2002/0016926).

Regarding claims 14, 20, Forin discloses a method comprising:

the connection-oriented VI channel is established by using a first work queue pair at the first node and multiple work queue pairs at each of the multiple other nodes, and associating the first work queue pair with each of the multiple other work queue pairs (**VI channel connection is established by having a descriptor posted in the receive queue of a host that includes a virtual address of the buffer where data received from a send queue of a remote location are to be stored** and thus the receive queue of a virtual interface of a local personal computer is associated with the send queue of a virtual interface of a remote personal computer, col. 15, lines 37-53; thus the first work queue pair is associated with the second work queue pair; see also paragraph 0022 of Regneir on how VI connection is established);

wherein the first work queue pair (**a first pair of send and receive queues in personal computer 20**, see col. 15, lines 37-43, elements 107, 108, Fig. 6) comprising descriptors to describe data to be transmitted (**comprising a descriptor to describe the virtual memory address of the buffer to be sent**, co. 15, lines 43-46) from a first node (**from a first personal computer**, element 20, Fig. 1) and to describe where to store data received (**and a descriptor to describe the virtual address of the buffer where data is received from a remote location**, see col. 15, lines 46-49),

Forin determines a first physical address (**virtual memory address**) to a second physical address (**physical memory address**) correspondence for the node in the network, wherein the second physical address is embedded or provided within the first physical address (**virtual memory address is mapped to physical memory address**, see col. 18, lines 3-7).

Forin does not explicitly show the connection-oriented VI channel connection is established between a host node and each of the other nodes based on local physical addresses of the other nodes.

However, Regnier discloses establishing a VI connection from a process in a first computer to a second process in a second computer based on the physical address of the second computer (paragraphs 0021, 0022, 0035, page 4, claim 12, lines 58-67 and page 5, lines 1-4).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the VIA network adapter of Forin with the teaching of Regnier such that the connection-oriented VI channel is established between a first node and each of multiple other nodes based on the physical address of the other nodes. The motivation to do so is to use the physical address of the remote node to specify the physical location of the remote node to which data messages are transferred.

The combination method of Forin and Regneir does not explicitly show determining a first physical address to a network address correspondence for a node of the network using a single address resolution protocol (ARP).

However, Nguyen discloses using ARP to correlate IP addresses to physical hardware addresses (paragraph 0029).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the VI channel connection method of Forin and Regneir with the teaching of Nguyen in employing ARP protocol such that VI channel connection method of Forin and Regneir will determine a first physical address to a network address correspondence for a node of the network using a single ARP protocol over the network. The motivation to do so

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is to resolve IP address an IP packet to the physical address of the destination node in order for the IP packet to be sent from the source node to the destination node.

Regarding claim 17, Forin discloses the apparatus of claim 6 wherein first physical address comprises a legacy or global physical address (**virtual memory address**), and wherein the second physical address comprises a local physical address (**physical memory address**, see col. 18, lines 3-7).

Regarding claim 18, Forin discloses all the aspects of the claimed invention set forth in the rejection of claim 17 above, except fails to explicitly show the apparatus of claim 17 wherein the legacy physical address comprises a MAC address for use in an existing or legacy network.

However, Forin discloses that the VIA network interface adapter can be an Ethernet card (see col. 14, lines 52-61).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system and method of processing I/O requests in Forin with the teaching of using an Ethernet card for the VIA Network Interface Adapter in Forin such that the virtual memory address comprises an Ethernet MAC address. The motivation to do so is to provide high-speed data communications between a host and a remote router on an Ethernet network using Ethernet MAC addressing scheme.

Regarding claim 19, Forin discloses all the aspects of the claimed invention set forth in the rejection of claim 17 above, except fails to explicitly show apparatus of claim 17 wherein the legacy physical address comprises a IEEE 802.3 Ethernet MAC address.

However, Forin discloses that the VIA network interface adapter can be an Ethernet card (see col. 14, lines 52-61).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system and method of processing I/O requests in Forin with the teaching of using an Ethernet card for the VIA Network Interface Adapter in Forin such that the virtual memory address comprises an IEEE 802.3 Ethernet MAC address. The motivation to do so is to provide high-speed data communications between a host and a remote router on an Ethernet network using the standard IEEE 802.3 Ethernet MAC addressing scheme.

Regarding claim 21, Forin discloses a method comprising:

obtaining a local physical address for a first node of a network (**virtual memory address of a personal computer**);

obtaining a legacy or global physical address for the first node based on the local physical address of the first node (**physical memory address is obtained from virtual memory address, see col. 18, lines 3-7**);

the work queue pair (**a first pair of send and receive queues in personal computer 20, see col. 15, lines 37-43, elements 107, 108, Fig. 6**) comprises descriptors to describe data to be transmitted (**comprising a descriptor to describe the virtual memory address of the buffer to be sent, co. 15, lines 43-46**) and to describe when to store received data (**and a descriptor to**

describe the virtual address of the buffer where data is received from a remote location, see col. 15, lines 46-49);

Forin does not explicitly show obtaining a local physical address for one or more other nodes in the network and establishing a connection-oriented virtual interface (VI) channel between the first node and each of the one or more other nodes in the network based on local physical addresses of the other nodes using a work queue pair.

However, Regnier discloses establishing a VI connection from a process in a first computer to a second process in a second computer by determining the destination address of the second computer **(based on the physical address of the second computer, paragraphs 0021, 0022, 0035, page 4, claim 12, lines 58-67 and page 5, lines 1-4).**

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the VIA network adapter of Forin with the teaching of Regnier such that the VI channel connection established between a host node and each of the remote nodes in a network based on local physical addresses of the remote node using the send and receive queue of the VI channel. The motivation to do so is to use the physical address of the remote node to specify the physical location of the remote node to which data messages are transferred.

The combined method of Forin and Regneir does not explicitly show using a legacy protocol to broadcast a request message over each of the established VI channels to obtain a network address of the first node.

However, Nguyen discloses broadcasting address resolution protocol ARP over established virtual tunnels to obtain the IP address of a destination node (paragraphs 0029, 0036, 0038, 0094, 0101).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system and method of combined method of Forin and Regneir of establishing VI channels with the teaching of using ARP broadcasts to obtain IP address of a destination node such that the combined method of Forin and Regneir will employ using a ARP/legacy protocol to broadcast a request message over each of the established VI channels to obtain a network address of the first node.

The motivation to do so is to utilize the VI channel architecture to reduce the latency associated with broadcasting ARP requests because VI channel allows data transfer between the buffers of a VI consumer and the network without copying data to and from intermediate operating system buffer memory.

Regarding claim 22, the combined method of Forin, Regneir and Nguyen discloses all the aspects of the claimed invention set forth in the rejection of claim 21 above, Forin further discloses the method of claim 21 further comprising:

determining the local physical address based on the global address of the selected one of the other nodes (**VI kernel agent of personal computer 49 translates virtual memory address to a physical memory address**, see col. 18, lines 3-7 and Fig. 1; note that personal computers 20 and 49 are similar).

Nguyen also discloses using the legacy protocol (**using ARP protocol**, paragraph 0029) to obtain a global physical address (**to obtain hardware address of the destination node**) corresponding to a network address of a selected one of the other nodes (**based on the IP address of the destination node**, paragraph 0029);

Regarding claim 23, Nguyen discloses the method of claim 21 wherein the network address comprises an IP address (**IP address of a destination node is obtained**, paragraph 0029).

Regarding claim 24, Forin discloses the method of claim 21 wherein the local physical address (**physical memory address**, see col. 18, lines 3-7) of each node (**personal computer**, element 20, Fig. 1) is embedded or provided within the legacy or global physical address of the node (**virtual memory address; note that virtual memory address is mapped to physical memory address**, see col. 18, lines 3-7).

Regarding claims 25-26, Forin does not explicitly show the method of claim 21 wherein the establishing a connection-oriented VI channel comprises establishing a one-to-many work queue bindings and a many-to-many work queue bindings between the first node and the one or more other nodes in the network.

However, Forin discloses one or more virtual interfaces managed by the VI kernel agent a VIA network adapter and each virtual interface comprises a send queue and a receive queue (col. 15, lines 19-53).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system and method of combined method of Forin, Regneir and Nguyen with the teaching of Forin in employing multiple send and receive queues at the VIA network adapter such that VI channel comprises establishing a one-to-many work queue bindings and a many-to-many work queue bindings between the first node and the one or more other nodes in the network.

The motivation to do so is to allow multiple communication interfaces for multiple I/O operations between an application and the VIA network adapter.

5. Claims 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Forin et al. (USP 6,321,276) in view of Nguyen et al. (US Publication 2002/0016926).

Regarding claim 27, Forin discloses a method comprising:

establishing a virtual interface (VI) channel between a first node and each of a plurality of other nodes in the network using a work queue pair (**VI channel connection is established by having a descriptor posted in the receive queue of a host that includes a virtual address of the buffer where data received from a send queue of a remote location are to be stored** and thus the receive queue of a virtual interface of a local personal computer is associated with the send queue of a virtual interface of a remote personal computer, col. 15, lines 37-53; see also paragraph 0022 of Regneir on how VI connection is established), wherein the work queue pair (**a first pair of send and receive queues in personal computer 20**, see col. 15, lines 37-43, elements 107, 108, Fig. 6) comprises descriptors to describe data to be transmitted (**comprising a descriptor to describe the virtual memory address of the buffer to be sent,**

co. 15, lines 43-46) and to describe when to store received data (**and a descriptor to describe the virtual address of the buffer where data is received from a remote location**, see col. 15, lines 46-49);

determining a local physical address corresponding to the legacy physical address based on the legacy physical address without use of a specialized address request protocol (**physical memory address is obtained from virtual memory address without using a specialized address request protocol**, see col. 18, lines 3-7).

Forin does not explicitly show using a legacy protocol to broadcast a request message over the VI channels including a network address; and receiving a response message including a global or legacy physical address corresponding to the network address.

However, Nguyen discloses broadcasting address resolution protocol ARP over established virtual tunnels to obtain a hardware address corresponding to the IP address of a destination node in an ARP reply (paragraphs 0029, 0036, 0038, 0094, 0101).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system and method of combined method of Forin and Regneir of establishing VI channels with the teaching of using ARP broadcasts to obtain IP address of a destination node such that the combined method of Forin and Regneir will employ using a ARP/legacy protocol to broadcast a request message over each of the established VI channels to obtain a network address of the first node.

The motivation to do so is to utilize the VI channel architecture to reduce the latency associated with broadcasting ARP requests because VI channel allows data transfer between the

buffers of a VI consumer and the network without copying data to and from intermediate operating system buffer memory.

Regarding claims 28-29, Forin does not explicitly show the method of claim 27 wherein the establishing a connection-oriented VI channel comprises establishing a one-to-many work queue bindings and a many-to-many work queue bindings between the first node and the one or more other nodes in the network.

However, Forin discloses one or more virtual interfaces managed by the VI kernel agent a VIA network adapter and each virtual interface comprises a send queue and a receive queue (col. 15, lines 19-53).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system and method of combined method of Forin and Nguyen with the teaching of Forin in employing multiple send and receive queues at the VIA network adapter such that VI channel comprises establishing a one-to-many work queue bindings and a many-to-many work queue bindings between the first node and the one or more other nodes in the network.

The motivation to do so is to allow multiple communication interfaces for multiple I/O operations between an application and the VIA network adapter.

Regarding claim 30, Forin discloses the method of claim 27 wherein the local physical address (**physical memory address**) is embedded within the global or legacy address of the node

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(virtual memory address; note that virtual memory address is mapped to physical memory address, see col. 18, lines 3-7).

Response to Arguments

6. Applicant's Remarks/Arguments filed on 4/6/2006 with respect to claims 1-10, 12-14 and 17-33 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Mew whose telephone number is 571-272-3141. The examiner can normally be reached on 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Seema S. Rao
SEEMA S. RAO 5/29/06
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

Kevin Mew *Km*
Work Group 2616